

RIVERS.

In Oklahoma the larger streams were at unusually low stages and many smaller tributaries were dry..

Low water continued in the Red River and changes were slight.

No material change occurred in the stage of the Arkansas during the month. At Little Rock, a stage of 0.7 foot below the zero was recorded on the 25th, which is the lowest recorded since observations began 31 years ago. Navigation was suspended during the month.

Low stages were recorded generally in the White River, but the stream was navigable in its lower reaches.

Only slight changes occurred in the Ouachita and low water continued during the month.

Below St. Louis the Mississippi fell slowly and low stages prevailed generally at the close of the month.

NOTES.

Colorado (F. H. Brandenburg, Section Director).—The weather during the month was unusually warm throughout the entire area, and at some stations the mean temperature was the highest of record for the month of November.

New Mexico (Charles E. Linney, Section Director).—This was one of the warmest Novembers of record, only 1897, with 46.5°, and 1901, with 46.4°, were warmer during the last 16 years.

Rociada, N. Mex. (Jose A. Baca).—Exceedingly dry weather prevailed for this season of the year. The snow has melted considerably on the main range, keeping streams quite full.

Tulia, Tex.—The ground is very dry and fall plowing is at a standstill.

Winfield, Tex.—The weather has been dry and water is scarce.

Kansas (T. B. Jennings, Section Director).—November was moderately warm and exceedingly dry, being the driest month experienced since the organization of the section in 1887. This was the eighth month this year with less than the normal precipitation and the accumulated deficiency is 9.85 inches.

Oklahoma (J. P. Slaughter, Section Director).—The precipitation was the lightest of record for November and that of the last three months has been much the lightest of any autumn during the last 20 years. The average for the last three months amounts to 2.43 inches as compared with a normal for the same period of 7.51 inches. This marked deficiency following the comparatively light rain of last summer has resulted in probably the most prolonged and acute drought condition that has been experienced since the country was opened for settlement in the spring of 1889. A considerable portion of the contemplated winter wheat acreage has not been seeded on account of the dry soil, and much of the wheat that has been sown has not come up, and the stand is probably the poorest in the history of the State.

Blandville, Ky.—Hailstones the size of guinea eggs fell on November 27, between 3 p. m. and 4 p. m., breaking windows.

Tennessee (Roscoe Nunn, Section Director).—The 27th was marked by warm, storm conditions, with thunderstorms and light hail at several stations.

Arkansas (H. F. Alciatore, Section Director).—This was the driest November experienced in Arkansas since observations began. There were 30 stations that received less than one-half inch of precipitation, and in Lonoke and Howard counties the amounts were inappreciable.

Mississippi (J. H. Scott, Section Director).—In only four instances during the last 22 years has the average precipitation for November been lighter than that of the current month.

The following information concerning drainage operations in Leflore County, Miss., was furnished by Mr. J. Obergfell, of Itta Bena: In the Ellsberry District, near Schlater, there are 6 miles of main canal and 5 miles of laterals, constructed at a cost of \$28,000 and draining 6,000 acres of land. In the Second District, located in the northern part of the county, 4,000 acres of land are drained by 5½ miles of main canal and 2 miles of laterals, constructed at a cost of \$13,000. Work was completed on those two projects during 1909.

In the Third, or Lake Henry District, situated in the central part of the county, the right of way is cleared for the construction of 8 miles of main canal and 3½ miles of laterals, that will benefit 5,000 acres of land, 2,000 acres of which will be reclaimed from a swampy condition. The cost will be \$36,000 and the work will probably be completed during 1911. Work has commenced in the Cude Drainage District, where 3,000 acres will be reclaimed and 15,000 acres benefited. The cost will be \$75,000 and the time allowed for completion is 16 months. There will be 9½ miles of main canal and 12½ miles of laterals.

THE DROUGHT OF 1910 IN KANSAS.

By S. D. FLORA, Observer, Weather Bureau.

Southern Kansas is passing through one of the most severe droughts since authentic records were begun in the State. The average deficiency in precipitation since the first of the year has been unprecedented in the valleys of the Neosho and Verdigris rivers and in the country along the Arkansas River from Great Bend to the Oklahoma line. In south-central Kansas and the upper valley of the Arkansas west of the Great Bend, but one year, 1893, has averaged drier than the present one.

Over the southern half of the State (District No. 7 in Kansas) the precipitation has averaged below normal for 8 of the past 11 months, resulting in a deficiency of 9.85 inches, or 34 per cent. March and November were the driest months of those names on record and June and October were each, with one exception, the driest months of those names on record.

In Chautauqua County the precipitation has been below normal since the beginning of the year. In Harper County, where the percentage of deficiency was greatest, but 46 per cent of the normal amount has been received.

With the exception of fall pastures and winter wheat the drought has not resulted in much damage to crops, as the precipitation was above normal in May and August.

The serious problem of the drought has been that of securing sufficient water supply for the cities of the Neosho and Verdigris valleys.

Though there is no authentic record of stream flow during past years in this region, it is the consensus of opinion that the streams are at the lowest point in 30 years and wells have failed that have never before been known to go dry. At Coffeyville the discharge of the Verdigris River at the middle of November was less than 10 cubic feet per second, and the disposal of city sewage and industrial waste from oil refineries and strawboard factories along the river was a grave question. The supply of water for fire protection was inadequate in a number of cities.

Conditions were much better in the Arkansas Valley west of Wichita, as the deep wells in this part of the country are fed by the "underflow," a subterranean sheet of water that is never perceptibly affected by a drought. The Arkansas River west of the Great Bend was practically dry during September and October, but below the Great Bend it has not been unusually low, as the supply of water here was largely furnished by the "underflow."